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THE NATURE OF EXPLANATION[1]

THE purpose this paper would accomplish is to define explanation, to compare it when defined with its genus, knowledge, and, finally, to examine some of its implications and general metaphysical bearings. So far as possible the problem will be kept isolated from other general problems and from the issues raised in solving them, for example, from the points in controversy between realism and idealism, and between rationalism and empiricism.

To explain is to analyze a whole into parts or a complexity into elements that are simpler and whose relations are simpler. This definition states that explanation is an analysis resulting in the discovery of parts or elements, that these parts or elements are simpler than the whole or complexity to which they belong and that the relations obtaining between them and other terms are simpler. The pragmatic value of explanation arises then from the fact that the simpler relationships which it discovers are easier guides of conduct.

Explanation thus defined bears what relation to its genus, knowledge? Psychology tells us that in the growth, or expansion, of information, no matter how interwoven and interfused the living mental processes may be, analysis reveals four processes usually present: to wit, new sensations, association, analytic attention and comparison. Important as the two former processes are in building up knowledge, still their office is rather to present the mind with the raw material that is to become known and, also, in the case of association, to keep the mind effectively in possession of the knowledge it has previously won. Mere sensation plus even extensive association would be knowledge only in the sense that mere sensation is knowledge, though, of course, it would be far more extensive, permanent and useful. Hence analysis and comparison are preeminently the cognitive processes, essential as the other two are; and the breaking up of a content or the unravelling of its components is preeminently what is meant by an increase of information.

[1] A paper read before the American Philosophical Association, December 27, 1906.

Any further account of the nature of knowledge would force us to analyze the content, that is, to study the object known. Only by so doing shall we discover the most important element in judgment, the nature of the information asserted.

What does analysis find in the content? Unless our rationalism be of that extreme form which seems to have been shown to be thoroughly false, we can answer: *terms and relations.* Thus judgment, or knowledge in its maturer form, stands forth as the discovery and assertion of a relation between terms.

If this brief account of the nature of knowledge be correct, explanation differs from other types of knowledge merely by being more complete, for it seeks to analyze exhaustively. In short, we may speak of three stages of knowledge: first, mere analytic attention, or discrimination; secondly, judgment; and thirdly, explanation.

Let us return to our definition to examine its implications and general metaphysical bearings. "To explain is *to analyze* a whole into parts or a complexity into elements."

By analysis two quite different processes are implied; the first we may name *substitution,* the second is *analytic attention.* The former is probably more often used to denote scientific analysis, but only the latter should be called analysis. By substitution we refer to a large number of familiar epistemological facts. First in importance is the preference the mind has to focus in attention the content to be interpreted, that is, to substitute a clear perception in place of one that is vague. Again, there is the tendency to substitute for an object as actually perceived another that may be called its standard perception. For example, the table seen in perspective is not rectangular, but we think of it as such, we treat it as such; and the distant object is, as seen, small, but this we correct by substituting our information of it as seen from near by. Another familiar fact is the substitution of the object as seen under a high-power lens for it as seen by the naked eye or through a lens of low power, *e. g.,* the real brain is not that of gross anatomy, but that of histology. Here, again, a new substitution takes place. Beyond the reach of the microscope are the chemical molecules, and the real brain is built up of them. Even here we can not stop, for the chemical atom must give place to the ultimate entities of physics. Finally, our list would be quite incomplete did it not include the reduction of the secondary qualities to primary, and also those substitutions in science where symbols are dealt with in place of the concrete entities.

It is beyond the scope of this paper to interpret these various substitutions except generically. Our problem is: What makes the substituted content preferable to the original? There are at least

two reasons: first, the substitute admits more readily of analysis, its structure being more complex or more open to view; secondly, its terms have more relations, simpler relations, or relations more frequently found and therefore revealing new similarities between objects and between their phenomena. In short, the substitute always gives a far richer or more valuable field for the work of explanation. Thus, though an essential part of explanation, its office is rather introductory to explanation, the latter beginning with analytic attention, or analysis proper.

Here one feels impelled to ask the question, By what right can we do this substituting and yet claim that we are explaining the original? The answer is, We can apply our explanation to the original only in so far as we know the relation or relations between it and its substitute. By this indirect means we learn how the truths our explanation has discovered hold of the original. These relations are various, and are by no means to be identified always with that between whole and part. On this account substitution is a better name for this process than analysis.

Let us consider next the nature of the process we have called analysis proper. Its nature may be made clear by showing what we mean by *simple* when we state that the parts or elements revealed by analysis are simpler and that their relations are simpler. What, then, does 'simple' mean, and are there absolute simples? The simple is the product of analysis, and analysis critically examined will always prove to be analytic attention at work dissecting some apprehended content. That is to say, we mean by the simples the elements or parts discriminated by analytic attention, and by the absolute simples those elements or parts which must forever baffle analytic attention.

That analytic attention does dissect apprehended contents, that the parts or elements thus discovered are simpler than the original content in the sense that sooner or later they commence to baffle analysis, and, finally, that there are parts, elements and relations in the apprehended contents which have until now completely baffled human analytic attention, are all truths easily verified. Of course, we may never be sure that analysis has anywhere reached a limit; but the increasing difficulty with which analysis progresses seems to indicate that we are in many places working at least on the borders of the absolutely simple. In short, the absolute simple is within reach.

This conclusion is open to two important objections. First, may not the real objects of the physical world be indefinitely complex? The proper reply to this objection should be apparent from the foregoing paragraphs. It confuses the two uses of the word analysis,—

substitution and analytic attention. Substitution may have no limits, but analytic attention does have its limits.

This failure to distinguish between the two processes seems to account, at least in part, for the difference in opinion among philosophers regarding the simple. Let reality be infinitely complex, this does not prevent the problem raised at any level of investigation from being solved by information whose terms and relations are simple, for simple terms and simple relations are always within the possible reach of analytic attention.

The second objection urges that knowledge is *organic,* and as such excludes the simple. To put a term in relation is to alter it, whereas the foregoing doctrine maintains that knowledge seeks and at least approximately finds simple terms which are not altered by standing in relation. Moreover, if this doctrine were correct, the sum total of truth would be an aggregate of monadic judgments. They would not constitute a system.

This opposing view contains four objections to which reply must be made. First, *to put a term in relation is to alter it.* But we do not literally put terms in relation, rather we *find* them in relation. Our analysis must not be confused with experimental analysis. To take out from a chemical compound one of its elements would no doubt change all radically. The analysis in explanation is purely an act of attention. We discriminate the terms and relations present in the content; and when we take a term out of relation, we merely turn our attention from the relation to the term. This alters neither.

Secondly, our thesis leaves the following questions quite open. Is the real so complex that it would take an infinity of judgments to interpret any part exhaustively? Or, is the real so truly unique that it would even then escape our judgments and require a higher type of knowledge, a higher immediacy, to apprehend?

Thirdly, we shall be told that a higher level of knowledge, just because knowledge is organic, alters all the truth as held at a lower level. This objection must be met by a flat denial. Hunt the history of science through, and produce a judgment partly true and partly false that can not be analyzed logically into at least two judgments, one quite true and the other totally false. In short, the half-truth of immature knowledge is due to deficient analysis, analysis of the type already examined, and would have been either completely false or completely true had this analysis gone farther. Should it be here objected, such half-truths must be forever the lot of man; we reply, When analysis has done its work exhaustively, then our judgments are either true or false. A higher level of knowledge either accepts or rejects them *in toto.*

Fourthly, Can such a mere aggregate of isolated judgments constitute a system? It can in the purely negative sense that no two judgments may contradict one another. It can so far as inference will carry us from ultimate simple judgments to such cognitive structures as pure mathematics and abstract mechanics. It can so far as some relations exist more numerously than do others. That is, though one simple judgment may not be simpler than another, it may hold more extensively, and thus we may get a principle of classification of judgments. Thus we may conclude, leaving it an open question whether or not a similar statement holds of the real, discursive knowledge in its final form promises to have as its premises a vast aggregate of isolated judgments. Explanation seeks simple terms and simple relations. To deny to science the right to isolate its problems would be to rob it of the instrument to which, above all others, it owes the success of the last two centuries.

Let us return once more to our definition. "To explain is to analyze a whole into parts or a complexity into elements." The definition points out that there are two distinct types of explanation. The first analyzes a whole into parts and, in the wide sense, is an atomic theory; whereas the second gives us abstract general laws. The two, though distinct, are not fundamentally different.

The parts into which a whole is divided are of two kinds. First, they may be entities which could exist quite independently, *e. g.*, the cells of a living body, the wheels of a watch. These are concrete entities. Second, the parts may be abstract entities, that is, parts from which so many properties are thought away,—or, better, to which so few properties are left,—that they would not be theoretically perceivable, *e. g.*, the mass particle of abstract mechanics.

These two types must be kept distinct. Confusing them has been one important cause of such a reaction against mechanism as the *Energetik*. An admirable illustration of confusion is given in Duhem's recent book, 'Physical Theory, Its Object and Structure.' He complains that the English physicists prefer to present things as seen or touched, and therefore they construct models for the details of theory. For them the ether is like glycerine or jelly. An atom is a vortex in a perfect fluid. Whereas for 'the French and Germans a physical theory is a logical system rigorously deduced and satisfying reason rather than imagination.'

Can we not clear up such confusion? If we mean by the existent that which is perceivable, it is invalid to talk of parts as existent which by definition are imperceivable. They are abstract entities. they are mere symbols, and should be treated as such. The rule indicating where the line is to be drawn between existent parts and symbolic parts is, of course, for the scientist to apply, but it is for the

epistemologist to formulate. To talk of an entity and surreptitiously to imply that it is visible when it lacks the condition of visibility, namely, light, is nonsense. If the ether is conceived merely as a medium for the transit of light but is itself lightless, then we are not to talk of it in any terms that imply visibility. Is it like glycerine? Is it a sort of jelly? In some sense, maybe, but surely not in the sense that would make color a property; and probably only in a sense that would make the ether a highly abstract symbol. Thus Duhem is right, such models or similes lack logical precision.

It should here be pointed out also that concrete entities, though in one respect markedly different from the abstract entity or symbol, could nevertheless be arranged in a series which passes over by degrees into that entity, and in turn, a series of these abstract entities could be formed which would pass by degrees into the merely abstract property. So far as explanation is concerned, all this but means the concentration of attention upon a narrower and narrower field; for attention is always dealing with the original, at least in one of its parts or elements, even when we substitute for them mathematical or other signs. To misunderstand this is to misunderstand the nature of explanation, is to regard it, as has been so commonly done from the days of the Greeks until now, as explaining the original literally by means of new entities working behind the scenes. To explain is to describe.

Our definition thus makes the metaphysical status of atomism evident. Atomism can be one of two things, a theory of existent entities and a merely methodological device. In fact, it is both. The former it is and should be only so long as the atoms are thought of as perceivable. It passes into the other the moment the entities are abstract, that is, are symbols. The question at issue between the *Energetik* and mechanism should not be, Are all physical events existentially the motion of mass particles? but, Do the laws and equations of kinetic energy hold of all the other energies, and are they logically more simple? If so, the other energies may be symbolized in terms of mechanism, and atomism here becomes merely a methodological device.

Finally, we come to the last element in our definition: Explanation seeks parts or elements whose relations are simple. The simple relations are the common ones and these, when formulated, give general abstract laws. Thus our definition harmonizes with the usual one,—to explain is to find a universal under which the particular case can be brought.

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INDIVIDUAL AND SOCIAL ETHICS

FOR a full half century past the tendency in ethics has been to emphasize the social factor. More clearly than ever before men have analyzed morality as a social function or concluded, with Leslie Stephen, that moral rules express the conditions of social health.[1] The content of duty has also been considered from the social point of view. So the western world has grown increasingly sensitive to the sufferings, and even to the demands, of the poorer classes in the community. The proletariat has steadily strengthened its claims to a larger share in the common stock of good. In place of the older individualism there has sprung up a consciousness of the responsibility of class to class, of the duties of the individual to the community as a whole and of the community to the individual, accompanied often by the conviction that, for the sake of these ideals, the state must assume larger powers than in the past it has been accustomed to exercise.[2] The duty of nation to nation, moreover, is gaining clearer recognition. It is true that international obligations may still be conceived in a spirit which would be condemned as unethical in an individual or a class. But if the era of international morality has not yet culminated, it has certainly dawned, and substantial progress may reasonably be looked for in the nearer future.

The causes of this social movement have been manifold. It is about three quarters of a century since Auguste Comte assigned to sociology its distinctive name and its place in the hierarchy of the sciences; it is a few years less than fifty since Darwin published the 'Origin of Species.' The new, or new-old, science was destined to cast a spell over the thought of the succeeding age, in particular to influence reflection in the fields of politics and morals. The theory of evolution spread rapidly from the physical to the moral field, and in the latter directly led to the social conception of ethical existence. Meanwhile forces of a more general kind were gathering momentum. The continuing social unrest and the growth of religious unbelief turned attention to the sore problems of mundane living. As the age wore on proof accumulated that the political revolution of the end of the eighteenth century, if it had furthered civil liberty, had failed to produce the economic prosperity which also had been augured from it. The development of communication and of its instruments enlarged man's social consciousness with reference to ever widening circles of his fellows. Industrial progress has accentuated the distinction of class from class, has deepened the problems

[1] 'The Science of Ethics,' Chap. IV., § II., *et passim*.

[2] Cf. the writer's 'Transitional Eras in Thought,' pp. 212–225.

of wealth and poverty, and in its later corporate phases has, by its own effects, brought the questions of social organization and social duty into the clearest possible prominence.

That great benefits have followed from the socialization of ethics is not open to question. Beyond all doubt its results deserve to be counted among the most valuable as well as among the most significant consequences of modern ethical development. A long step forward has been taken in the evolution of moral theory and in the amelioration of conduct. If practise at times lags behind principle, that is a recurrent phase of progress which should have no more importance assigned to it than in other cases of a similar type. The fact that our problems have been solved only in part, that questions of the gravest nature still press for consideration, must also be recognized as a normal incident of intellectual and moral growth.

The exaggerations to which social ethics is subject are more serious. Probably there are no terms employed in present thinking which stand in greater need of precise definition than 'society' and 'social,' with their derivatives. In the discussions of the day they are used to designate anything and everything from charitable organizations to collectivistic theories. "If you only join the two words 'social' and 'evolution' in your speech nowadays, everybody at once listens to find out what you have to say,"[3] Professor Royce has remarked, although he doubtless believes in both the movements which he parodies. Believes, that is, within limits of reason and definite application. But it is just these limitations which are apt to be overlooked, since they depend on principles which recent thinking, for all its value, has tended to ignore. In ethics an important illustration is furnished by the question of the ethical individual. Who, or what, in the last analysis forms the subject of morality? Can it ever be the group, the class, the state, or is it always in the last resort the individual person? Collective individualities, of course, there may be, and 'moral persons' in contrast to the individuals in the literal sense of whom they are composed. This distinction is familiar and possesses inherent force. But, considered from the strictly ethical standpoint, has it ultimate significance? Can moral responsibility be fully transferred from the real person to the group of which he forms a member, no matter how closely the bonds are drawn between him and his associates or how completely they act together as a collective unity? Obligation is sharable, indeed, but can it be altogether alienated? In fine, is not each man responsible for his own deeds, whether he act by himself or along with others, although in the latter case the plurality of the agents may justly be considered in the allotment of praise or blame?

[3] *Philosophical Review*, March, 1904, p. 130.

Such questions, moreover, are not mere matters of theory, but practically important; especially at the present time do they bear upon issues of serious moment. As remarked above, the growth of collective industry has furthered the socialization of moral ideas. But there is a reverse side to the picture, which is to be found in the substitution of corporate responsibility, or license, for the sense of individual obligation. Not only is it assumed that the corporation is free from duties to which the individual would consider himself bound, not only may it take action which for himself alone the latter would unhesitatingly condemn; his responsibility is also held to be absorbed in that of the body as a whole. When it is thought through to its results, however, this conclusion shows itself unsound. Obligation may be altered or diminished by being shared with others; it can not be extinguished, the individual can not divest himself of responsibility for the action in which he takes a part. Therefore the demand for a quickening of conscience in regard to 'corporation morals' is grounded in principles as well as proved desirable by lamentable concrete results. And here as elsewhere a clearer appreciation of ethical truth will give needed support to moral practise.

A second ethical question suggests similar inferences. This concerns the object of ethical action, as the former dealt with the subject of morality. To whom, or to what, is right conduct due? On what, or on whom, does its outcome terminate? To our fellow men, on society, would be the unhesitating reply of the overwhelming majority of later moralists. Differing from one another as radically as the moralists of other ages have done in regard to the ultimate nature of right and wrong, they would largely agree in basing their analyses on the social phases of duty. In particular, the ethical writers of the evolutionary school have given prominence to this aspect of conduct. In its origin morality is described by them as a function of tribal existence. Conscience is believed to have developed with the experience of collective need. Obligation means responsibility for the adoption of such courses of action as will conduce to social welfare and efficiency. Duty toward self loses its significance in comparison with duty toward other men, or the duties of self-preservation, self-maintenance and the like are interpreted as depending on the contribution which the healthy, vigorous, developed individual makes to the common good.

Exceptions to this tendency, of course, have not been wanting. One of the strongest elements in Mr. Spencer's ethics—suggested, perhaps, by his personal experience—was the emphasis which he was wont to lay on the duty of the individual to care for his own well-being. In his doctrine of the superman Nietzsche raised a less measured protest against the morality, as he conceived it, of the

unsuccessful and the weak. The critical examination which is making of the principles of socialism reenforces from the side of economic science the ethical recoil toward juster views of the relations of individual and social duty. There is room, however, for further progress in this direction. If responsibility in the last analysis is personal, it is also true that the society on which the moral action terminates is made up of individual units, among whom the agent himself is one, with personal rights and duties to himself as well as obligations to regard the claims and needs of fellow men. Nay, further, it is but half a paradox to say that all duty, including our duty to others, is in one essential aspect duty toward ourselves. For each man owes right conduct to himself. It is part of his moral manhood, an element in his own self-respect, to observe ethical rules, including such as primarily benefit his brethren or the community of which he and they are fellow members. In a sense, therefore, moral obligation is always obligation to one's self.

The practical consequences of this principle also are evident. Added to the implications of the earlier conclusion, they forbid the sinking of the individual in the mass. Ethics is a matter of individual responsibility; it is also a matter of personal self-respect. Obligation may be shared, but it can not be alienated. The service of others includes an element of duty to self. The spread of such principles would not diminish the benefits which have sprung from the social view of morality, although it would tend to correct the balance of ethical theory. Their acceptance, on the other hand, would elevate and fortify the ethical practise of our time.

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DISCUSSION

PRAGMATISM VERSUS SCIENCE

ACCORDING to Professor James, science has 'broken down,' and to this pragmatism, or humanism, 'owes its being.' Whatever this penetrating philosopher believes deserves public consideration. Nevertheless, science embodies the beliefs of the greatest number of conservative and weighty thinkers in present civilization. It is well, then, to review both sides of the case before accepting the new gospel.

The 'two states of mind' (Professor James's phrase) originate, largely, in different assumptions regarding 'the world of physics.'

Every informed man to-day distinguishes between his vision or perception of another man, and the other man himself. From this

percept he infers the other man's mind. This sort of inferring is widely called paralleling. Both pragmatism and science parallel 'the line of evolution,' as we commonly say, down approximately to protoplasm. They similarly infer human minds, monkey minds, infusoria minds, etc.

At protoplasm pragmatists hesitate. And further down the line they do not carry out this paralleling. For perceptions of tables and of granite they do not make similar inferences. Instead, they identify such objective percepts as the ultimate objects themselves. For pragmatists the physical world is the sum of such percepts.

For pragmatists, therefore, 'that table' and 'percept of that table' have one meaning. Likewise, 'the physical world' and 'our percepts of the physical world' have identical meaning. This, although 'Professor James' and 'percept of Professor James' have very different meanings.

Also, and consequently, there is a fundamental looseness in every pragmatist's meaning of 'a thing.' In Professor James's famous explanation of 'how two minds can know one thing,'[1] he calls two percepts, in the two minds, one and the same thing, though he admits that the two percepts are much unlike. Thus he calls 'one' what are as much two as the minds are two. Likewise, regarding all other 'things,' pragmatists call 'one thing' what, to science, are innumerable different percepts, in innumerable separate minds. To science this seems as grave a source of error as would be that of calling and treating all the stars of the firmament as 'one star.' How this looseness contributes to the belief that science has broken down should be kept in eye.

In any case, since for pragmatists 'the physical world' is merely the sum of human percepts and concepts of it, since for them no other things and firmament exist, therefore it is easy to see how they derive, from this 'human' physical world, their belief that the 'dogmas' of science concerning it are mere 'human inventions.' And from this to the belief that these 'dogmas' are subservient to one's esthetic and religious ideals, and are to be accepted, rejected or modified accordingly, is an inevitable step for certain temperaments. In passing, we note that both pragmatism and Christian Science alike originate with Berkeley, both hold his notion of the physical world, both measure 'truth' similarly, and both are similar 'states of mind.'

In strong contrast with all this, science infers something, similarly, for all our objective percepts and concepts. It does not identify our physical percepts with their objects, does not intend the same meaning by 'tables,' 'things' and 'physical world' as it does by 'perceptions of' them. It consistently makes as sharp distinction

[1] 'How Two Minds Can Know One Thing,' this JOURNAL, Vol. II., p. 176.

between these meanings as between 'Professor James' and 'perception of Professor James.' Also, it does not loosely confound 'one and the same thing' with innumerable unlike perceptions in innumerable separate minds. It is not surprising that such vastly different assumptions, meanings and uses of words as these, respectively, of pragmatism and of science, weave to very different 'states of mind.'

There are scientists who are pragmatists. But officially and in accord with the inmost beliefs of by far the greatest number of its leaders and followers, science rejects the Berkeleian notion. Professor James tacitly admits this when he says 'science' has broken down. Nevertheless, science does not reject this notion naïvely. Scientists are as wise of Berkeley, of Kant, of the nature of our percepts and of all the latest psychology as are perceptualists. But they see alternative conclusions to those of pragmatism.

If the above sort of mental parallelism be carried out for all 'objects' or for 'the entire content of space,' and if the plain man's world be preserved as well, this gives us two physical worlds, one mental, the other spatial: twin worlds, parallel throughout, whole for whole, and detail for detail. These furnish us with double objects of knowledge, universally. Therefore 'Occam's razor' bids us reject one of these worlds as superfluous and improbable. And since it seems best to decide that the universe (of which our own minds indubitably are parts) is of one general sort throughout, therefore it seems best to decide the above choice in favor of a physical world in some way mental. Yet this need not leave us pragmatism.

To conceive a non-spatial world to take the place of the spatial one which science still officially but tentatively presumes, is admittedly difficult. Pragmatists, with all other perceptualists or followers of Berkeley, declare the feat impossible. Hence their refusal to carry parallelism further down than protoplasm, and their identification of the world of physics with the sum of our body percepts. Nevertheless, a large school of modern opinion holds that there are ways in which the difficulty may be overcome.

Formerly the physical world was conceived to be comprized of innumerable 'material attributes,' each and all of which were incompatible with mind. Also the human mind was conceived to comprize numerous faculties and features equally incompatible with matter. Under these conditions the difficulty of identifying mind with matter did seem insurmountable. But of late both physics and psychology have done vastly much to simplify the problem.

Physics, according to many of its greatest authorities, has simplified itself by reducing its physical world to one homogeneous, universal fluid; or, to state the case more exactly, by bringing all the

concepts with which physics has heretofore busied itself under one general concept of an universal, mutable space. Therefore, in so far as physics is concerned, 'the difficulty' is now reduced to conceiving a mental universe which this concept of 'one mutable space' may perfectly symbolize.

Meanwhile psychology has equally simplified its conception of mind. Two of its leading schools, those of Professor James and of Professor Wundt, have reduced all minds to content processes, to content of one general sort, like our colors, smells, tastes and other sensory elements. They conceive all such content to be 'continuously transformative': for examples, that a color utterly transforms into and becomes, perhaps, a taste or a sound; that a vision or perception turns, perhaps, into a concept or idea, this into a train of reasoning, this into a succession of percepts, concepts, ideas, judgments, beliefs, emotions and so on, throughout life.

According to this conception, all mental processes whatsoever reduce to such content transformations. Every individual mind is such a continuous content process, from its birth forward. Only its present transforming state exists at any given time. All past states cease to exist, absolutely. The universe comprizes innumerable such minds, of innumerable grades. All alike begin with some simplest possible condition of mere mental content, and all alike grow or develop, throughout their transformative stages, in accord with the same general laws of mental genesis. But some grow more and higher than others. Hence the 'line of mental evolution' comprizes, first, the simplest possible minds, then all the rising grades, such as infusoria minds, lobster minds, monkey minds, human minds, and we know not what other minds of still higher attainments.

There are still schools of philosophy which do not accept this simplified version of the mind and of the universe. But confining our present discussion to those hypotheses, open to science, which are most in accord with those of Professor James, it is now to be observed that the difficulty of conceiving a physical world which our all-embracing concept of space may symbolize, resolves, according to the above version, into that of conceiving what 'the mutable space' of present physics may mean or signify in terms of this continually transforming mental content distributed in these innumerable minds of various grades.

The key to this is found, by some, in presentative genesis. 'Presentative form' is a phrase denoting the make-up of any present state of mind. Of these forms there are three main types: fused, numerical and spatial. Fused forms show no parts, either numerical or spatial; smells are of this type. Numerical forms show parts, but no spatial arrangement; sound harmonies example this type.

Spatial forms show both numerical parts and spatial arrangement; our sight and touch presentations are of this sort.

In Kant's day these 'categories' of form were attributed to separate 'faculties.' To-day it is demonstrable that they are different stages of presentative development, which shade each into the next higher, under one and the same law of genesis. All alike derive from respective degrees of serial stimulation of our nerve ends; or, more exactly, from the order of activity of our brain cells, to which such stimulation leads. This may be stated in terms of Professor James's 'pure experiences' instead of either 'stimulation' or 'brain cells,' yet its significance remains unchanged.

Smell nerves, in the nose, are always stimulated *en masse;* smells are always fused. Taste stimulations are mostly 'massive'; tastes are mostly fused. Touch stimulations, on the roving tongue, are in fine series; from the tip of the tongue we get our finest tactual space presentations. The touch nerves of the skin afford lineal stimulation in every direction; their results are spatial. The heat and the cold nerves of the skin, though they have the same arrangement as the touch nerves, are affected by temperature changes *en masse;* their sensations are fused. The nerves of sound, in the ear, are hit sometimes together, but far more often serially; we hear some harmonies, but sounds are never spatially arranged. Muscle, visceral and pain nerves for the most part are stimulated *en masse;* for the most part their sensations are fused. The nerves of the eye are stimulated in finer bundles than anywhere else, and in every direction; our visions are most clearly spatial. Finally, the same nerves that ordinarily give us 'a straight line' may be educated to give us a triangle or some other figure.

Throughout all our senses, then, our presentative forms follow one general law of continuous development or genesis. There is no law of psychology, or of physics, more demonstrable; there is none more important. The significance of this law, for our main theme, is momentous in more ways than one, and may prove decisive.

According to modern genetic psychology, and especially that of Professor James, the mind is an indivisible whole or solidarity. So also is its genesis; from birth, it develops as a whole. Always it knows as a whole. Therefore, in view both of the mind's action and its genesis, its 'spatial faculty,' if we roughly so call its power of knowing by means of our space presentations, must be indivisible from its knowing power as a whole, must be 'warp and woof' with it at all times. From birth they grow up together and inseparably. Our above law of genesis explains the fact, and makes the deduction imperative. In Kant's day of separate faculties it was easy to reject that of space, and to trust only certain supposed higher faculties.

But to-day this is absurd. To suspect one faculty is to suspect all; they are indivisibly one. For example, if we reject the spatial testimony of our senses, we must not only reject their numerical testimony as well, but also the power of the mind to know numerically at all. All alike are the indivisible product of one and the same historic genesis, and the spatial testimony is the higher and the inclusive product.

But in face of all this we find Professor James, with other perceptualists and pragmatists, accepting the testimony of our spatial percepts and concepts for inferring minds 'all the way down to protoplasm,' yet rejecting such testimony 'below protoplasm,' and for inferring a physical world in some way mental, apart from *all* our percepts and concepts alike. In view of Professor James's own psychology, therefore, his method of inference seems in the highest possible degree inconsistent and suspicious. In view of his psychology, the Berkeleian inference is now, unmistakably, an anachronism. For it one must divide the indivisible knowing power of the whole mind, so much insisted on by Professor James for all else, and must accept only so much of it as suits one's 'state of mind.' Possibly here is another clue to the pragmatic belief that science 'has broken down.'

Our genetic law yields revelations regarding the physical world of still greater moment. In any mind, every line (such as we see, or feel by touch) presents spatially the non-spatial elements or 'pure experiences' from which it has genesis by reason of their forerunning serial order of occurrence, 'activity' or 'stimulation.' The line not only represents these non-spatial elements, but also their genetic or habitual order of activity. The reversible, or, as we commonly say, the fixed, order of the line from end to end reveals a correspondingly fixed or habitual order of activity in the elements of universal mental content so presented; those from which they have genesis by our law. Through the line we *know* these elements and their 'fixed order.'

But all our spatial presentations or experiences are made up of such lines. Through such presentations we similarly know all their corresponding regions of cosmic origin and their order of activity. Moreover, all psychologists now agree that these spatial presentations develop into our spatial percepts of objects and of things; these, in turn, into our corresponding concepts of things and of space; these, into our final concept of one universal space and of its contents. Therefore by tracing back this genesis (from concepts to percepts, from percepts to presentations, from presentations to their component lines, and from each spatial line to the non-spatial mental elements from which they derive) our genetic law enables us to deter-

mine the ultimate universe for which science and philosophy have been so long in search, enables us to determine the mental universe which all our percepts and concepts 'know,' and enables us to do this satisfyingly at once of the precision demanded by science and of the empiricism insisted upon by Professor James and all pragmatists.

This gives a possible alternative to the 'human world of physics' assumed by pragmatists, gives a universe of mental content whose 'continual transformations' constitute a non-spatial 'world order' which satisfies every demand at once of physics and of psychology. In this fixed world order each transformative part has a 'functional place' corresponding to the 'spatial place' which symbolizes it in our percepts, concepts and every-day mental life. Each mental part transforms accordingly as every other mental part transforms, throughout the universe, transforms according to the law of gravity and all the other laws of physics and of the psychophysics of modern psychology. In short, all these laws apply to this mental universe precisely as they aforetime were conceived to apply to the material universe.

Just as in ordinary physics certain fundamental laws apply to all matter, and other special laws apply only to certain kinds of matter, so, under this new conception, do all laws still called physical apply to and describe the transformations that occur in mental content without regard to the individual minds that contain it; while other special laws, those of individual psychology, govern and describe the transformation processes in particular minds.

According to this alternative it is conceived that the universe, in so far as our knowledge of it extends, began with one primitive, homogeneous mind; and that the genesis of separate individual minds and of rising grades of minds, such as 'evolution' calls for, transpired, and still transpires, by one and the same system of upward-trending laws.

At first sight this seems to necessitate the 'cracking in pieces' and 'gluing together' of mental content, which Professor James vehemently declares is 'inconceivable' in view of the indivisibility of 'a mind.' But even he conceives that mental content 'comes into' and 'goes from' every mind. And though we conceive this 'coming and going' to be from nowhere and into absolute nothingness, as he apparently does, still it is open to us to conceive that it is reciprocal: that when any content 'goes from' any mind, in Professor James's own way, a precisely similar content 'comes into' some other mind, also in his own way, and all without 'cracking' or 'gluing.' How often does philosophy hang on mere metaphor!

This removal of Professor James's fundamental objection, it

would seem, leaves him no reasonable excuse for persisting in his Berkeleian hypothesis and rejecting the above alternative. The latter starts from his own psychological premises, and never transcends them. It avoids the no longer excusable inconsistencies of 'stopping at protoplasm' and of calling innumerable percepts one and the same thing. It conforms to the unity of the mind's knowing power and to the unity of its genesis. It preserves the indispensable significance of 'space' and of 'place.' It preserves to physics its cosmic validity, to science and to philosophy a uniform language, and to all language its essential meanings. It unites physics and psychology, science and philosophy, experience and religion, all on one workable ground. All of which things pragmatism hopelessly upsets. Above all, it promises a united advance of unprecedented moment to mankind.

Science has not committed itself to this particular alternative. It does hold fast till some equivalent of it 'proves out.'

Before comparing the larger promises of science and of pragmatism, we may examine their contrasting methods and their definitions of truth.

Pragmatism declares itself to be a method of discovering truth in consequences. The meaning of any concept 'lies in its consequences.' "The truth of any statement *consists* in the consequences, and particularly in their being good consequences." Truth is 'highest satisfaction,' 'highest belief.'

The method of science already includes taking account of all possible differences and consequences. It also includes search for and interpretation of present data. Pragmatists can differ from this only by abandoning these latter and confining themselves to speculation as to the future alone. It seems incredible that they should consciously intend this, however unmistakably their writings declare it and their philosophy bears evidence of its having been done.

We now reach the most famous feature of pragmatism, its definition of truth. "At each and every concrete moment," according to Professor James's official formula, "truth for each man is what that man 'troweth' with the maximum of satisfaction to himself."

To all mankind, heretofore, truth has meant 'conformity to fact.' Facts may conform in two main ways. Barometers conform when they themselves are alike. Things that are thus alike have been called 'truthful copies.' Barometers are not thus copies of the weather, yet they conform to the weather in their reactions. Such reactions have been called 'truthful reactions.' The gist of pragmatism, in so far as its definitions of truth and of knowledge are concerned, lies in its exaltation of reaction, and its disparagement of copying even to the extent of denying it wholly where, heretofore, it

has been deemed indispensable both to truth and to knowledge. This is exampled in the following quotation from Professor James: "Let the reader suppose himself to constitute for a time all the reality there is in the universe, and then to receive the announcement that another being is to be created who shall know him truly. How will he represent the knowing in advance? What will he hope it to be? I doubt extremely whether it could ever occur to him to fancy it as a mere copying. Of what use to him would an imperfect second edition of himself in the newcomer's interior be? It would seem pure waste of a propitious opportunity. The demand would more probably be for something absolutely new. The reader would conceive the knowing humanistically, 'the newcomer,' he would say, 'must *take account of my presence by reacting on it in such a way that good would accrue to us both.* If copying be requisite to that end, let there be copying; otherwise not.' The essence in any case would not be the copying, but the enrichment of the previous world."

On its face, this reminds one of the casuistry by which the hands of the clock exalted themselves above the pendulum and the weights. If the reader would fancy anything of the kind,he himself will judge. In any case, the fact is indubitable that both reaction and resemblance, or 'copying,' are equally indispensable to all truth and knowledge of the ordinary sort. According to Professor James's explanation of 'how two minds can know one thing,' this knowing is constituted wholly by the appearing, in the two minds, of two *like* perceptual processes at appropriate times. Without likeness or 'copying,' therefore, no two minds could ever 'know one thing,' even according to Professor James's own account of the matter. And this is but saying that no mind could ever know what any other mind, being, or thing-in-itself might be like, could ever know it in the ordinary sense of knowing, *no matter how he reacted to it.*

Most criticisms of pragmatism have been directed against its denial of 'copying' as involved in its definitions of truth and of knowledge. In the heat of discussion it has been overlooked that these definitions are quite as irreconcilable with their pretended exaltation of 'reaction,' as with the indispensableness of 'copying.' If Professor James reacted to any given sort of divine direction, now with 'satisfaction' and as often with 'dissatisfaction,' plainly there would be in this as little 'conformity of reaction' as 'truthful copying.' Moreover, in order to defend the belief that divine satisfaction is a reaction to divine direction, it is not necessary to violate all established definitions of truth. Also, it is not necessary to 'break down' all language in order to prove that all science has 'broken down,' in case it has done so. Suppose a man does react to a pouring rain, with the belief that he is walking in sunshine, and with 'the maximum of satis-

faction to himself at that concrete moment,' as an insane man well might: hardly will Professor James call this concrete instance of trowing 'a true trowing.' Just why, therefore, his abstract definition of truth is so much more attractive to the 'pragmatic state of mind' than the innumerable concrete instances that obviously contradict it, can only be accounted for by the 'state of mind' itself. We can only infer that Professor James contends for his definition of truth, as he does in his 'Varieties of Religious Experience,' for all conditions of 'trance,' be they alcoholic, epileptic or 'religious'; that its authority is likely to be conceded only by those who have experienced the 'trance.'

No man who follows out the dictates of modern psychology to consistent inference of a physical world which satisfies all our percepts and concepts, will fall into the belief that 'ether is a noun for the verb to vibrate,' that the laws of physics are 'mere human inventions' and that science has 'broken down.' The man who from carelessness, or academic habit, starts from the Berkeleian anachronism and inconsistently conforms his inferences to it, is already far on the road to that belief. Yet back of both starting-points, temperament is apt to be a deciding factor in the making as well of a pragmatist as of a scientist. Education and circumstance may counteract it; they also may confirm it.

The respective temperaments of pragmatism and of science may very significantly be called the impatient and the patient.

To the impatient man the betterment of mankind by the toilsome researches of science, is too remote. To him the regeneration of human souls by a better system of education and by a better system of social and industrial economy, is too slow a method. He must have immediate evangelism. To him the conception that the value of life is in the living, is repulsive. That the joys of heaven are to be found in the direction traversed, he resents. He demands immediate translation. He frames his philosophy and his religion accordingly.

Nevertheless, the 'patient' interpretation of life, of science and of heaven has 'broken down' only for the impatient.

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REVIEWS AND ABSTRACTS OF LITERATURE

La misura in psicologia sperimentale. ANTONIO ALIOTTA. Firenze: Galetti & Cocci. 1905. Pp. 253.

This treatment of measurement in psychology is a work of criticism, and very acute criticism, written, however, by one who does not follow

the analytical method so narrowly as to despise acquaintance with the detailed results of experiment. The book might, indeed, serve as a useful survey of the different ways in which measurement has been attempted in psychology, and of the results achieved. But its whole aim is critical.

The main thought of the author can be stated in brief compass. The data of psychology are solely the facts of internal experience, and these, taken simply as they are, without reading into them the results of analysis and hypothesis, are not quantitatively determined. One psychical fact differs from another in quality, and that is all. It is impossible to find in consciousness a system of quantitatively related data. Therefore measurement can not be applied in pure psychology, nor can laws of mathematical form have any direct validity there. Indirectly, such measurements and laws may be of service to psychology, but only as suggestive or as symbolic.

Quantity must be conceived as continuous and divisible; psychical facts are neither. To apply measurement to conscious phenomena, they must be conceived as different from what they appear, but so to conceive them is to destroy, not to explain them. "A psychical fact is as it presents itself in consciousness; if we conceive it otherwise, if we seek to represent it in some other manner, our conception applies perhaps to some other possible psychical fact, but has nothing to do with the fact under examination" (p. 58). This, a fundamental error of the psychophysicists, is unmasked in every disguise in which it has sought to commend itself. First Fechner, in order to get a measure of sensation, had to conceive the perceived difference of two sensations as itself a sensation; but introspectively 'the act of observing a difference between two sensations does not in the least consist in the representation of a sensation which is the difference of the first two' (p. 59). According to Wundt, next, psychophysics measures, not, indeed, sensations, but the perceptibility of sensations. But sensations are not present *to be* perceived, but only *as* perceived; nor is perceptibility a psychical fact—only actual perception is such. Or if, again, with Ebbinghaus and Meinong, we suppose psychophysics to measure the difference or similarity of sensations, we must, since the methods of psychophysics depend on the measurement of errors, conceive of error as being possible in judging differences of sensations, and thus conceive of the sensations as having an existence independent of our perception of them. As to Foucault's interpretation of psychophysics as measuring the clearness of sensations, it is simply not true that clearness, as a purely psychical condition, is so closely correlated with the accuracy of perception which the methods of psychophysics determine that the latter can be regarded as a measure of the former.

Most interesting, perhaps, is the author's criticism of the view of Stumpf that what is measured is the accuracy of sensory judgment. This is, indeed, measured, but it is distinctly not a psychical datum. Error of judgment is not pure psychical fact; the false judgment has the same psychical reality as any other state of mind. Error comes to

light only when the psychical fact is compared with the physical fact judged, that is, when the psychical fact is examined, not for itself, but as a means to knowledge. What is measured is the difference between the unaided subjective estimate of a physical fact and some more exact determination of this fact. It is always a physical measurement. A science treating of the accuracy of judgment is thus not psychology, but gnoseology.

The fundamental assumption of psychophysics, namely, that sensations are more or less intense, is itself false. They have, no doubt, a certain intensive quality, as they have a certain extensive quality or 'extensity,' and this intensive quality comes into play in the perception of the intensity of physical processes. But it is nearly as naïve to infer thence that sensations possess intensity, as it would be to argue from the fact of space-perception that sensations have extent. Psychophysics, as a branch of gnoseology, determines the accuracy of our perceptions of intensity; as a branch of psychology, it should set itself to the task of contributing to the analysis of the process of intensity-perception, in which field there are real problems analogous to the moot questions of space-perception and of time-perception.

This section on psychophysics is the longest and most brilliant part of the work. The rest of the book treats in turn of 'psychochronometry,' 'psychodynamics,' and 'psychostatistics,' the latter section being quite brief and inadequate in comparison with the rest.

Under the head of psychochronometry are discussed the measures of simple and complex reaction times. Severe strictures are passed on the elimination method, by which the duration of the processes of perception, discrimination and association is supposed to be measured. The mental process in these higher acts is not really compounded of the simple reaction plus something; the whole process is different, the constituent parts are modified by their union, and their duration is therefore not reliably determined by the method of elimination. Moreover, most experimenters have not bothered themselves to ascertain empirically, by introspective observation during the experiments, exactly what mental processes were being timed. The mental process was simply schemed out beforehand. Psychical facts can, of course, theoretically, and sometimes practically, be measured as to their duration, but as this is the only measurement of which they admit, quantitative laws can not be founded on it; for such laws require the measurement of at least two related quantities.

Under the head of psychodynamics are treated, first, the attempts to measure mental energy in terms of its muscular effects. Lehmann's mental energy turns out to be either physical or else a nondescript; it is not a psychical quantity. Measures of the force or quantity of memory are likewise not psychical measures. The consciousness of six nonsense syllables is not twice as big a consciousness as the consciousness of three; it is simply a different consciousness. And the ability to reproduce the syllables at will is not a psychical fact, nor is the degree of retention a psychical magnitude. Measures of attention, in terms of

distraction or otherwise, are not measures of the psychical fact of clearness; and measures of the range of consciousness are merely determinations of the number of objects of a particular sort which can be grasped as a unitary group. Measures of mental work and fatigue are measures of the physical effects of mental action. Mental tests do not reveal quantitative differences in the mental states of individuals: the mental differences are qualitative, the quantities are physical. In general, functions are not introspectively observable, and are not psychical facts; and the measurement of their efficiency is not a psychological measure.

The author's criticism is carried much more into details than is indicated by the foregoing summary. There is much in the book that is not strictly new. New is, perhaps, the thoroughness with which the range of psychological measurements is examined from the introspectionist's point of view, and new also the clearness with which the criticism is presented. The book makes good reading. There are a few apparent errors in citations of facts, a few inaccurate references to publications, a goodly sprinkling of typographical errors, and an evident disposition on the part of the author to favor the simplification of English spelling, as witness 'Kirkpatrik,' 'Mak-Kendrik,' 'Cattel' regularly, with 'Kattel' as a variant.

Two main objections to the thought of the book occur to the reviewer. First, something too much is made of the heterogeneousness and discontinuity of conscious facts, and of the consequent inapplicability of measurement to them. Were there no homogeneity, no chance for classification, there could be no descriptive psychology. Mental facts do show degrees of likeness and difference, and can sometimes be arranged in ordered series. A set of twenty color tones can easily be arranged by an untutored person in order of likeness, and gaps in the series can be observed. This is an ordering of sensory qualities, and involves something very like a rudimentary measurement. Similar arrangements can be made on the basis of intensity or of esthetic effect. Psychical facts are thus seen to be related in definite ways, some of which form the basis of measurement; though it is no doubt true that the problem of measurement does not clearly arise within the psychical sphere taken alone, and that the fully developed concept of measurement can not be transferred to that sphere without doing it violence.

Objection should also be raised to the loophole which the author allows for measurement in psychology. He does not seem willing to follow his logic to the bitter end, and so exclude quantitative work altogether from a share in the furtherance of what he defines as psychology proper, the 'morphology of consciousness.' It may be that consideration of the present state of the science bluffs down his logic, and that, just as history disposes of the Kantian query whether psychology can become an experimental science by showing that it has become one, so the applicability of quantitative methods could not well be denied in the face of the wide application that is made of them. Are all these measurements valueless? No, answers the author; though psychical phenomena are measured in none of them, yet indirectly they fix the mental

facts through the medium of related physical facts, and add precision to the results of introspection. Thus does the author, after standing so valiantly against it, fall captive at last to the psychologist's fallacy. Psychical facts are such only as they are revealed in inner experience; to infer them from the results of physical measurement is false logic, and any precision gained in thus supplementing the results of introspection is factitious. The example of brightness contrast, adduced by the author in this connection, is far from convincing. Measurements of the contrast effect do not contribute in the least towards a description of consciousness, but merely state more precisely the relation between the contrast effect and its physical conditions. What quantitative psychology is concerned with is, indeed, not the description of consciousness, but something which is probably of much more importance, namely, the causal relations subsisting between mental events and their physical conditions and consequences. Cause and effect are on the whole a more important study than morphology; and so far from the use of quantitative psychology being the furtherance of the description of consciousness, it will probably in time be recognized that the main value of descriptive psychology lies in its contribution toward the discovery of causal laws which overpass the bounds of the psychical. This is not psychology, will be the retort. But psychology, after all, is what we make it.

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L'Attention spontanée dans la vie ordinaire et ses applications pratiques. Roerich. *Revue Philosophique,* August, 1906. Pp. 136–159.

With the following statement giving the limitations of his discussion, M. Roerich begins his subject: "Spontaneous or primary attention is distinguished from voluntary attention in this, that while in the former the subject becomes attentive through the force of an impression or the suggestion of an idea from without, in the latter the subject becomes attentive through a process of conscious initiative and contingent choice" (p. 136). There are two aspects in this kind of attention, which may be called the primary and the apperceptive. "Primary attention is the effort by which we try to know more fully a fact or an object which vividly impresses our sense-organs, to satisfy ourselves with those aspects of the situation which have stimulated the organism" (p. 136). This is well illustrated by our reactions to a cannon shot, a light, a blow, sufficiently strong to rouse us from a state of indifference. In a similar manner a very weak sound, an indistinct light, a sigh, may excite our attention. As the author insists, primary attention is usually mixed with other forms of attention, and any treatment of it as such must be, therefore, a logical one.

In a number of interesting examples M. Roerich shows the function of primary attention in practical life. I shall give only one. Suppose a man, lost in a deserted field, to see a light in the distance. What can it be? He proceeds to investigate and pass judgment just as does a scien-

tist in the laboratory. He sees whether the light moves or not, whether it grows brighter or dimmer, whether it is accompanied by any voice, noise, barking of a dog, rolling of a carriage, etc. He adjusts his actions accordingly. His first stimulation is an example of primary attention. His mental operations after such stimulation show the working of apperceptive attention.

As regards the pragmatic aspects of primary attention we may distinguish laws of attention from rules of attention. The basic laws of primary attention as scientifically determined are the following:

"I. If the subject is attentive, the reaction time is very short. If the subject is inattentive (which is the case in involuntary attention), the reaction which the impression excites takes a much longer time" (p. 141).

"II. There is no such thing as voluntary attention sustained for more than a few seconds at a time. What is called sustained voluntary attention is a repetition of successive efforts which bring back the topic to the mind. . . . No one can possibly attend continuously to an object that does not change"[1] (p. 141).

"III. A certain period of time is necessary between changing perceptions in order to allow the judgment to operate upon them. If the time is too long the perceptions become isolated and are effaced. If the time is too short the perceptions become confused and the attention can not seize them with sufficient ease" (pp. 141–142).

The maxims or rules resulting are the following:

"I. To rouse the primary attention and make it persist, the impressions which follow one another must be graded either in intensity or in vividness" (p. 142). For example, a lecturer should not use a monotonous tone, but should vary his words in pitch, intensity, inflection, etc.

"II. The regular repetition of the same impression or of similar impressions will not rouse the attention unless there is between the successive impressions a period of time which is neither too long nor too short" (p. 142). The series of slides in a stereopticon exhibit would thus demand a proper spacing, as it were, in the showing.

"III. To rouse the attention, an object must be clearly and distinctly presented" (p. 142).

"IV. Only those impressions of dissimilar nature can be associated which belong to the same object" (p. 143).

"V. It is by contrast of successive or simultaneous impressions that primary attention is most surely excited" (p. 143).

Concerning apperceptive attention we may consider it as due to ideation of a 'preperceptive' nature, to use the expression of Lewes. "It is a special form of spontaneous attention which is roused by the appearance of a new impression or idea among those previously acquired" (p. 144). The appearance of such a new impression is well illustrated by the entering of a new comet into an astronomer's horizon. This is at once apperceived by him, though to the general observer it might remain unnoticed. Similarly the absence of some familiar impression will also rouse the

[1] The author takes this from James, 'Principles of Psychology,' II., p. 420.

attention. When a shepherd assembles his flock, if there be one missing he will apperceive it almost intuitively. He does not need to recount his flock. It is as if a ring in a chain were suddenly removed. In either case certain acquired ideation masses are necessary.

Rabelais and Rousseau knew well how to utilize these forms of attention. So, too, Cicero in his orations and Cæsar in his political manipulations made use of them. And in modern fiction the skillful novelist does not present his moral. He gives his facts and then leaves the reader to form the conclusion, to construct the moral himself. There is use made of the reader's ideation masses, if he has any.

As above, M. Roerich gives a law for apperceptive attention and also a number of rules. We have but a single law.

"In every moment of consciousness which is not under voluntary guidance the accuracy and the rapidity of the conscious states increase in proportion to the extent, variety and proper coordination of the associated ideas" (p. 151).

The following rules result:

"I. In order to get apperceptive attention it is not necessary that the presentation be new, provided it appear in a new form" (p. 152). Thus Phédre, Iphigenia, Orestes, Achilles, etc., are historical personages with whom all are familiar. But how well are they presented by Racine, Glück, Goethe?

"II. To facilitate apperception, the new presentation should resemble the acquired ideas, though it need not be identical with them" (p. 153).

"III. The new presentations should be connected with the old by a series of graded transitions, which result in successive stages of distinctness and clearness" (p. 154).

"IV. Between two culminating points in apperceptive attention there should be a period of deliberation and judgment" (p. 156). Such a period is necessary to allow of proper assimilation and ideal coordination. Time for rest and recuperation is also necessary to prevent fatigue.

The account given by M. Roerich is an excellent one. Though he does not bring out the motor aspects of attention, still he makes up for this by emphasizing its pragmatic aspects. Psychologists too often are like the people,

> "— that dwell up in the steeple,
> All alone,
> And who, tolling, tolling, tolling,
> In that muffled monotone,
> Feel a glory in so rolling
> On the human heart a stone."

It is refreshing when one comes out of his shell and applies his science to concrete situations, tests his theories by fitting them to the world about him. M. Roerich has made a creditable endeavor in this direction.

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JOURNALS AND NEW BOOKS

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. July, 1906, Band 42, Heft 2 u. 3. Abteilung für Psychologie. *Beiträge zur speziellen Psychologie auf Grund einer Massuntersuchung* (pp. 81–127): G. HEYMANS and E. WIERSMA. – Preliminary paper giving gross results of a questionnaire study of mental heredity in four hundred families. The questionnaire, sent to physicians of Holland, consisted of ninety questions relating to various mental traits. The results show uniformly mental heredity and that generally the inheritance is homosexual. In intellectual traits there are interesting variations in the dominance of maternal and paternal influence. *Studien über die experimentelle Beeinflussung des Vorstellungsverlaufs* (pp. 128–161): MAX LEVY-SUHL. – The problem of this investigation is to determine the nature of the reactions of the mentally diseased to word-stimuli interjected suddenly while the patients are talking and to determine whether there are characteristic reactions for the various forms of mental disease. Critique of association experiments with isolated words. The importance and rôle of the 'constellation.' *Die Verlegung diaskleral in das menschliche Auge einfallender Lichtreize in den Raum* (pp. 162–174): OTTO VERAGUTH. – If light is concentrated on the retina through the sclerotic on the temporal side of the eye, the light is perceived not only on the nasal side of the visual field, but *also* on the temporal side. Some individuals see a double light, a more intense one on the temporal side and a weaker one on the nasal side. The same individuals perceived only a single light with diascleral stimulation from the nasal side. Theoretical considerations suggested by the observations. *Eine Nachbilderscheinung* (pp. 175–178): A. PRANDTL. – Explanation of the illusion of direction produced by the bright after-image streak which follows the movement of the eye over a luminous object in a dark field. The rapidity of the eye-movement and the short duration of the after-image, which decreases rapidly from the luminous point where it is most intense to any other point, brings it about that as a matter of fact we see merely the after-image of the luminous point and it seems as if during the eye-movement or immediately after it the streak moved towards this point. *Literaturbericht.*

Delvalve, Jean. *L'organization de la conscience morale.* Paris: Felix Alcan. 1906. Pp. 172. 2 fr. 50.

Dietzgen. *The Positive Outcome of Philosophy.* Chicago: Chas. H. Kerr & Co. 1906. Pp. 444.

Fitch, M. H. *The Physical Basis of Mind and Morals.* Chicago: Chas. H. Kerr & Co. 1906. Pp. 266.

Gebhardt, Carl. *Spinozas Abhandlung über Verbesserung des Verstandes.* Eine entwicklungsgeschichtliche Untersuchung. Heidelberg: Winter. 1906. Pp. 117. 3 M.

Hooper, Charles E. *The Anatomy of Knowledge.* An essay in objective logic. London: Watts & Co. 1906. Pp. 226. 3s. 6d.

Montgomery, Edmund. *Philosophical Problems in the Light of Vital Organization.* New York and London: G. P. Putnam's Sons. 1907. Pp. 462. $2.50.

Paulhan, Fr. *Le mensonge de l'art.* Paris: Felix Alan. 1907. Pp. 380.

Pfordten, Otto v. de. *Versuch einer Theorie von Urtheil und Begriff.* Heidelberg: Winter. 1906. Pp. 73. 2 M.

Congress of Arts and Science, Universal Exposition, St. Louis, 1904. Edited by Howard J. Rogers, A.M., LL.D., Director of Congresses. Vol. VIII. *Education, Religion.* Boston and New York: Houghton, Mifflin & Co. 1906. Pp. x + 493. $2.50 *net.*

NOTES AND NEWS

In the untimely death of Professor Charles Edward Garman, of Amherst College, the philosophic community suffers a loss which it will be hard, if at all possible, to repair. Professor Garman's name has not figured largely in the journals, nor did he ever put his philosophy into book form; yet his influence has been and will continue to be great. A partial estimate of it can be made from the number of his former pupils who are now teaching philosophy or psychology; it appears that, in proportion to the size of the institution at which he taught, he has trained more professional students of these subjects than any other American professor. Such an estimate is still only partial, for, more than most teachers of philosophy, he made the subject very real to his students, so that those who have followed quite other lines of work still keep an interest in philosophy, and apply 'Garman's system' to the problems of their lives and of the times. They retain, to a remarkable degree, both the method—the standards of criticism—and the negative and positive results which were reached in his courses. He owed this success in part to the intense personal interest which he took in the progress of his students as individuals, to his insistence on independent thinking, and to his skill in adapting his method of presentation to the varying responsiveness met in different years. But his success as a teacher of philosophy was also due in large measure to the plain fact that he was not merely a teacher of philosophy; in a very true sense of the word, he was a philosopher. Philosophy was to him something vital, compelling, inspiring. Its history was not simply a record of technical achievement, but a growth in man's mastery of himself and of his conditions. How much of a stir in the philosophic world would have been created by the publication of Garman's philosophy, it is hard to guess. Perhaps the most striking feature of his positive doctrine was the view that, since consciousness gives us our only direct insight into reality, we have the right to take the essential characteristics of consciousness as fundamental to the

world at large; from which he reasoned that both intelligence and purpose were of the very essence of things.

R. S. WOODWORTH.

The *Missouri State Republican,* a weekly newspaper published in St. Louis, is printing in successive numbers extracts from 'A Mechanic's Diary,' by the late Governor H. C. Brokmeyer, of Missouri. He was one of the earnest and enthusiastic Germans who, after the revolution of 1848, so effectively transplanted the philosophy of Fichte and Hegel from its native soil to America, and who initiated the movement of which the *Journal of Speculative Philosophy,* under the worthy editorship of Dr. W. T. Harris, was for so long the exemplar. The diary contains, along with autobiographic material and shrewd comment upon business and political affairs, much that is of a directly philosophical nature. For example, in the issue of January 4 there is an extract, dating from 1856, in which the writer, after referring to his having entered upon his *annual* course in Hegel's 'Logic,' gives his own account of the problem and worth of that book. The series contains much of value both to the student of Hegel (and, incidentally, of Spinoza) and to the student of the fortunes of philosophy in America.

Professor Josiah Royce, of Harvard University, is giving a series of five lectures at the University of Illinois. His general subject is 'Loyalty as an Ethical Principle.' The special topics of the five lectures are: 'The Problem of Ethics'; 'Four Ideals of Personality'; 'Loyalty as a Personal and Social Ideal'; 'Loyalty as a Factor in American Life'; 'Personality and Immortality.'

Dodd, Mead and Company are to publish 'American Philosophy—The Early Schools,' by Professor I. Woodbridge Riley, who has collected his material from neglected books and unpublished manuscripts. Professor Riley regards Emerson as standing for the typical American philosophy, to which the early movements led up.

ON Monday evenings in February and March Professor Henry Edward Crampton, of Columbia University, will deliver a series of lectures upon 'The Doctrine of Evolution: its Basis and its Scope,' at Cooper Union.

WALTER SMITH, M.A. (Edinburgh), Ph.D. (Tübingen), professor of philosophy in Lake Forest College 1890–1905, died at Charlottesville, Virginia, January 10, 1907.

THE Reverend Charles Edward Hart, D.D., professor of ethics and evidences of Christianity at Rutgers College, has been made professor emeritus of ethics, after twenty-six years of service.

THE Southern Society for Philosophy and Psychology held its second meeting, in Montgomery, Alabama, December 27–29.

DR. HUGO MÜNSTERBERG, professor of psychology in Harvard University, has returned to Cambridge after a visit to Germany.

DR. FRANZ BOAS, of Columbia University, has been elected president of the American Anthropological Association.